

# ENVIRONMENT AUDIT

STUDY PERIOD (TWO YEARS) 2021 – 2022 & 2022 - 2023

Sustainability study  
**AUDIT REPORT**

Studied for  
**Dolphin (PG) Institute of  
Biomedical and Natural Sciences**

VPO Manduwala, Chakrata Road,  
Dehradun – 248007,  
Uttarakhand, India

Studied in the capacity of  
Accredited and Certified GBP



Website: <https://thegreenviosolutions.co.in/>

Email: [greenviosolutions@gmail.com](mailto:greenviosolutions@gmail.com)

# Disclaimer

The Audit Team has prepared this report for the **Dolphin (PG) Institute of Biomedical and Natural Sciences** located at VPO Manduwala, Chakrata Road, Dehradun – 248007, Uttarakhand, India based on input data submitted by the Institute analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the internal team. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

  
**Ar. Nahida Abdulla**

**Greenvio Solutions**

*Developing Healthy and Sustainable Environments*

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting audits

Palghar District, Maharashtra- 401208

[sustainableacademe@gmail.com](mailto:sustainableacademe@gmail.com)



## Acknowledgement

The Audit Assessment Team extends its appreciation to the **Dolphin (PG) Institute of Biomedical and Natural Sciences, Uttarakhand** for assigning this important work of Environment Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are extended are due to everyone from the Management.

Our heartfelt thanks extended to Chairperson of entire process **Dr. Shailja Pant**, (Principal) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection.

- ⇒ Teaching members – **Dr. Shruti Shama**
- ⇒ Non-teaching staff members – **Mr. Gaurav Bhatia**

We appreciate the cooperation of the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

### **Sustainable Academe**

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

# Contents

<b>Disclaimer .....</b>	<b>1</b>
<b>Acknowledgement .....</b>	<b>2</b>
<b>Contents.....</b>	<b>3</b>
<b>1. Introduction.....</b>	<b>4</b>
<b>2. Overview.....</b>	<b>6</b>
<b>3. Research .....</b>	<b>6</b>
<b>4. Evidence.....</b>	<b>8</b>
<b>5. Documentation .....</b>	<b>9</b>
<b>6. Suggestion .....</b>	<b>Error! Bookmark not defined.</b>
<b>7. Compilation.....</b>	<b>Error! Bookmark not defined.</b>



# 1. Introduction

## 1.1 About the Institute

### 1.1.1 Vision

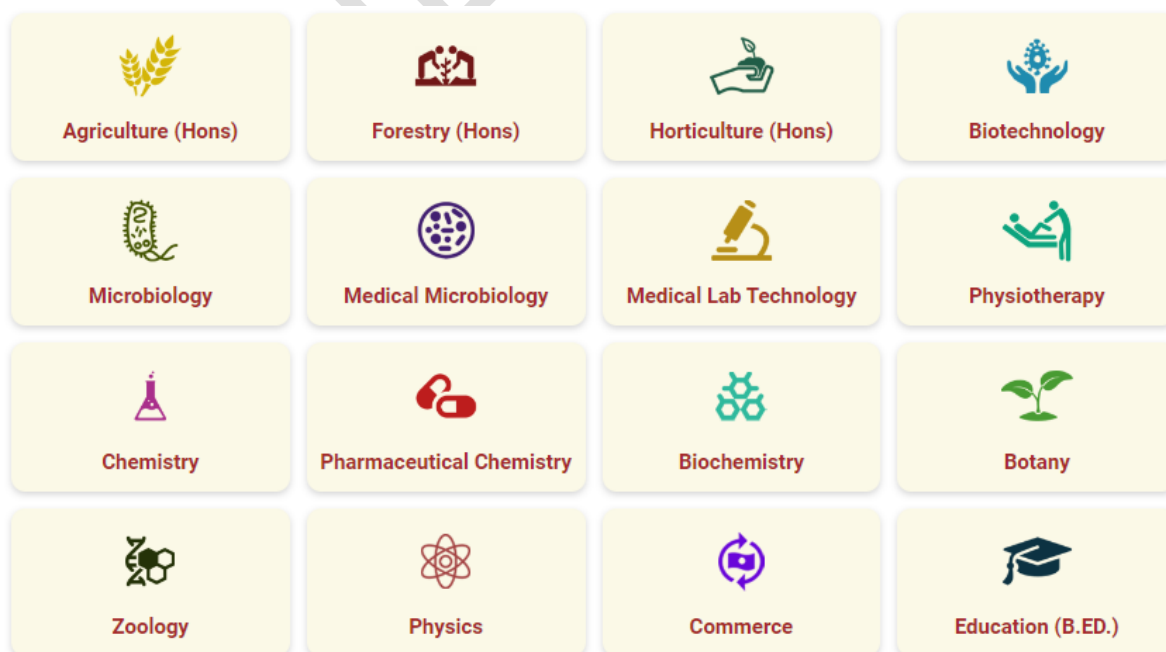
The Institute proposes "To create an educated and ethical society by imparting quality education with holistic development and empowering the youth to achieve global competence."

### 1.1.2 Mission

The College adheres and focuses towards:

- To empower youth with academic excellence
- Maintain high standards in extracurricular activities
- Holistic development of the youth
- To provide Skill based education with entrepreneurship proficiency
- Research and Innovation
- To serve humanity as socially responsible global citizens

**The Institute's department portfolio includes:**



**Plate 1: Department portfolio of the campus**

## 1.2 Assessment of the Institute

### 1.2.1 Affiliations

The courses provided by the College have received their affiliation through the **H.N.B. Garhwal Central University**, Srinagar, Garhwal, Uttarakhand

### 1.2.2 Recognitions

The College has achieved:

- Recognition under section [2 \(f\) of the UGC Act, 1956](#) by University Grants Commission, New Delhi
- Approval of [National Council for Teacher Education \(NCTE\)](#), New Delhi
- Approval of [Govt. of Uttarakhand, Indian Association of Physiotherapists \(IAP\)](#)

## 2. Overview

### 2.1 Summarised Populace analysis for 2021-2022

#### 2.1.1 Students data

The data (shared by the Institute) shows there were **2,315 students**.

#### 2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	108	46	154
2	Teaching staff	47	32	79
3	Non-Teaching staff	18	01	19
<b>Total Staff Members</b>		<b>173</b>	<b>79</b>	<b>252</b>

*Table 1: Staff data of the Institution for 2021-2022*

The staff data shows the Institute premises **252 Staff Members**.

### 2.2 Summarised Populace analysis for 2022-2023

#### 2.2.1 Students data

The data (shared by the Institute) shows there were **2,021 students**.

#### 2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	106	46	152
2	Teaching staff	44	31	75
3	Non-Teaching staff	17	01	18
<b>Total Staff Members</b>		<b>167</b>	<b>78</b>	<b>245</b>

*Table 2: Staff data of the Institution for 2022-2023*

The staff data shows the Institute premises **245 Staff Members**.

## 3. Research

### 3.1 About the Green Building Study

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

### 3.2 Analysis of the Green Building Study

The procedure included detailed verification as follows:

- ➔ Investigation
- ➔ Technical
- ➔ Observations
- ➔ Inferences

### 3.3 Strategy adopted for Green Building Study

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

### 3.4 Site Area

The Institute spread over **4.172 acres** of land with multiple blocks and landscape areas comprising of **15,36,021.86 sq. ft.** built-up area.

### 3.5 Establishment

The Institute established and began its operations in **2002**.

### 3.6 Operation and Maintenance of the premises

The Institution is open from **Monday to Saturday between 09:30 to 16:30 hours**.



## 4. Evidence



*Plate 2: Investigation of the systems and facilities*



*Plate 3: Seminar on subject related to Sustainability for the stakeholders*

**Note: The text mentioned in this type of font (red colour, bold and italics style) determines a suggestion**



## 5. Documentation

### 5.1 Open Spaces

The first hand observations about the space documented below:

- The campus has a huge green cover in the form of an open space
- In addition, it has pocket landscape areas that include:
  - Botanical garden
  - Organic farming area
  - Varieties of potted plantations
  - Landscape spaces within and in adjacent site areas

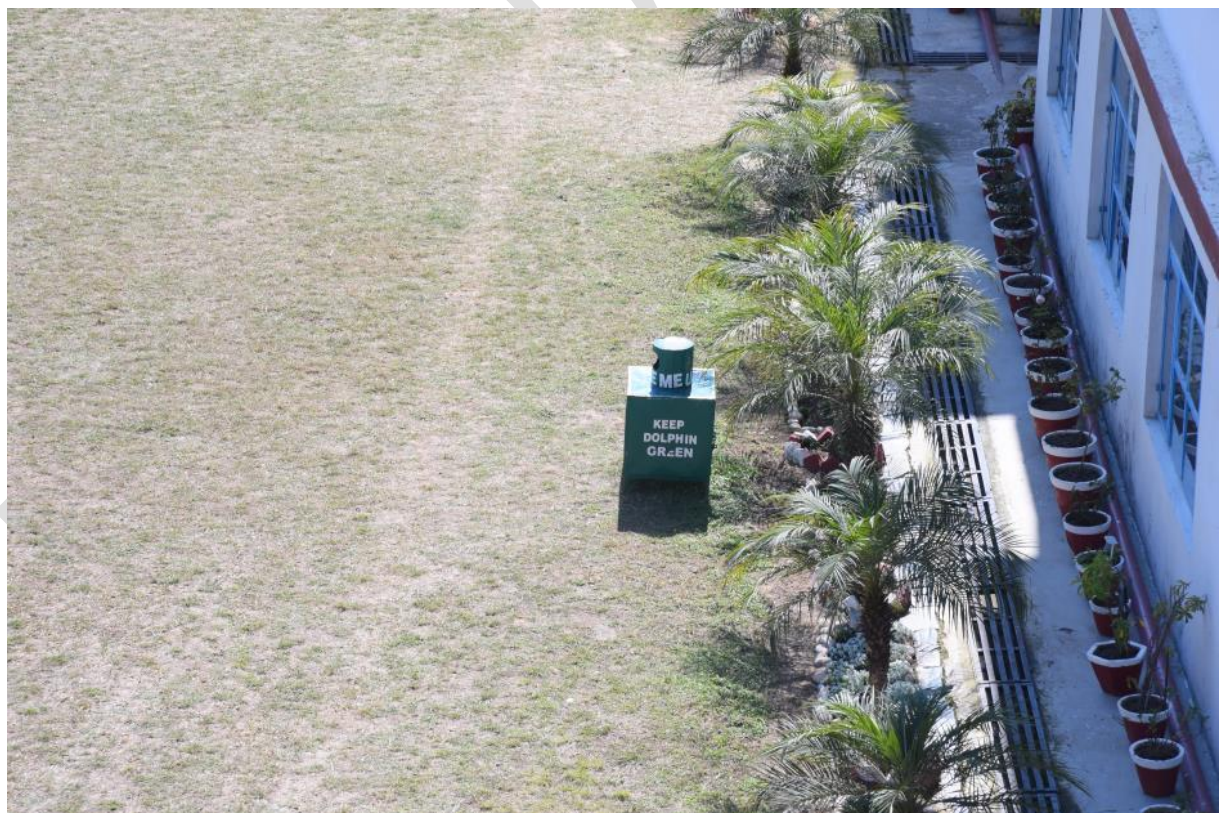


*Plate 4: Plantations in the organic farm*





*Plate 5: Organic farm in the premises*



*Plate 6: Open space in the premises*

## 5.2 Flora audit

A flora survey to identify the total numbers of plants and trees by internal team as documented below displays the verities of the plantations.

S. No.	Plant name	Type	Nos.	Planted by
<b>Through seed</b>				
1	<i>Albizia lebbek</i>	Tree	1000	Planted by students
2	<i>Acacia catechu</i>	Tree	1000	Planted by students
3	<i>Bahunia varigata</i>	Tree	1000	Planted by students
4	<i>Bombax ceiba</i>	Tree	1000	Planted by students
5	<i>Bamboo spp.</i>	Herb	1000	Planted by students
6	<i>Cassia fistula</i>	Tree	800	Planted by students
7	<i>Cassia glauca</i>	Tree	800	Planted by students
8	<i>Dalbergia sissoo</i>	Tree	1000	Planted by students
9	<i>Delonex regia</i>	Tree	1000	Planted by students
10	<i>Jacaranda macroflora</i>	Tree	200	Planted by students
11	<i>Leucaena leucocephala</i>	Tree	1000	Planted by students
12	<i>Phyllantus emblica</i>	Tree	500	Planted by students
13	<i>Quercus leucotrichophora</i>	Tree	100	Planted by students
14	<i>Quercus serrata</i>	Tree	100	Planted by students
15	<i>Sapindus mukorossi</i>	Tree	50	Planted by students
16	<i>Terminalia ballerica</i>	Tree	200	Planted by students
17	<i>Sterculia foelida</i>	Tree	100	Planted by students
18	<i>Thespesia populiea</i>	Tree	100	Planted by students
<b>Through cuttings</b>				
1	<i>Ocimum sanctum</i>	herb	50	Planted by students
2	<i>Rose</i>	herb	100	Planted by students
3	<i>Chamaecostus cuspidatus</i>	herb	100	Planted by students
4	<i>Bryophyllum pinnatum</i>	herb	100	Planted by students
5	<i>Morus alba</i>	Tree	100	Planted by students
6	<i>Bougainvillea spp.</i>	herb	100	Planted by students
<b>* The number of plants distributed freely for plantation and restoration work under extension activities</b>				



Botanical Garden Plants				
1	<i>Acorus calamus</i> L.	Herb	1	Planted by students and staff
2	<i>Aegle marmelos</i> L.	Tree	1	Planted by students and staff
3	<i>Aloe arborescens</i> L.	Herb	1	Planted by students and staff
4	<i>Aloe vera</i> (L.) Burm. f.	Herb	1	Planted by students and staff
5	<i>Amomum subulatum</i> Roxb.	Herb	1	Planted by students and staff
6	<i>Andrographis paniculata</i> Burm.f.	Herb	1	Planted by students and staff
7	<i>Artemisia sp.</i> L.	Shrub	1	Planted by students and staff
8	<i>Asparagus racemosus</i> (Willd.) Oberm.	Shrub	1	Planted by students and staff
9	<i>Azadirachta indica</i>	Tree	1	Planted by students and staff
10	<i>Bacopa monnieri</i> (L.) Pennell	Herb	1	Planted by students and staff
11	<i>Bowgenvillea sp.</i>	Shrub	5	Planted by students and staff
12	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Herb	1	Planted by students and staff
13	<i>Calotropis procera</i> (Aiton) W.T.Aiton	Shrub	1	Planted by students and staff
14	<i>Centella asiatica</i> (L.) Urban	Herb	1	Planted by students and staff
15	<i>Cichorium intybus</i> L.	Under shrub	1	Planted by students and staff
16	<i>Datura metel</i> L.var. <i>fastuosa</i> (L.) Saff.	Under shrub	1	Planted by students and staff
17	<i>Ficus religiosa</i>	Tree	1	Planted by students and staff
18	<i>Ginkgo biloba</i> L.	Tree	1	Planted by students and staff
19	<i>Justicia adhatoda</i> L.	Herb	1	Planted by students and staff
20	<i>Lawsonia inermis</i>	Shrub	1	Planted by students and staff
21	<i>Nyctanthes arbor-tristis</i> L.	Shrub	1	Planted by students and staff
22	<i>Ocimum gratissum</i> L.	Under shrub	1	Planted by students and staff
23	<i>Ocimum santum</i> L.	Under shrub	1	Planted by students and staff
24	<i>Origanum majorana</i> L.	Under shrub	1	Planted by students and staff
25	<i>Oroxylum indicum</i> (L.) Benth. ex Kurz	Tree	1	Planted by students and staff
26	<i>Rauwolfia serpentina</i> (L.) Benth. ex Kurz	Shrub	2	Planted by students and staff

27	<i>Santalum album</i> L.	Tree	1	Planted by students and staff
28	<i>Stevia rebaudiana</i> (Bertoni) Bertoni	Herb	1	Planted by students and staff
29	<i>Withania somnifera</i> (L.) Dunal	Herb	1	Planted by students and staff
30	<i>Brunfelsia pauciflora</i> (Cham. & Schltld.) Benth.	Herb	1	Planted by students and staff
31	<i>Cestrum nocturnum</i> L.	Shrub	1	Planted by students and staff
32	<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees & C.H. Eberm.	Tree	1	Planted by students and staff
33	<i>Cymbopogon flexuosus</i> (Nees ex Steud) W.Watson	Herb	1	Planted by students and staff
34	<i>Cymbopogon martinii</i> (Roxb.) Wats.	Herb	1	Planted by students and staff
35	<i>Cymbopogon winterianus</i> Jowitt ex Bor	Herb	1	Planted by students and staff
36	<i>Gardenia jasminoides</i> J.Ellis	Herb	1	Planted by students and staff
37	<i>Jasminum sambac</i> (L.) Aiton	Shrub	1	Planted by students and staff
38	<i>Matricaria chamomilla</i> L.	Herb	1	Planted by students and staff
39	<i>Mentha piperita</i> L	Herb	1	Planted by students and staff
40	<i>Mentha arvensis</i> L. Wild mint	Herb	1	Planted by students and staff
41	<i>Mentha citrata</i>	Herb	1	Planted by students and staff
42	<i>Mentha spicata</i> L.	Herb	1	Planted by students and staff
43	<i>Murraya paniculata</i> (L.) Jack	Shrub	1	Planted by students and staff
44	<i>Origanum vulgare</i>	Herb	1	Planted by students and staff
45	<i>Pelargonium graveolens</i> L.	Herb	1	Planted by students and staff
46	<i>Rosa banksiae</i> W.T.Aiton	Shrub	1	Planted by students and staff
47	<i>Rosa damascena</i> mill L.,	Shrub	1	Planted by students and staff
48	<i>Thymus serpyllum</i> L.	Herb	1	Planted by students and staff
49	<i>Vetiveria Zizanioides</i> (L.) Nash	Herb	1	Planted by students and staff
50	<i>Cuphea hyssopifolia</i> Kunth	Shrub	1	Planted by students and staff
51	<i>Duranta erecta</i> 'Variegata' L.	Shrub	1	Planted by students and staff



52	<i>Duranta repens</i> L.	Shrub	1	Planted by students and staff
53	<i>Iresine herbstii</i> Hook. ex Lindl.	Shrub	1	Planted by students and staff
54	<i>Acacia catechu</i>	Tree	1	Planted by students and staff
55	<i>Bambusa ventricosa</i> Mc Clure	Shrub	1	Planted by students and staff
56	<i>Elaeocarpus sphaericus</i> (Gaertn.) K. Schum	Tree	2	Planted by students and staff
57	<i>Ficus krishnae</i> C. DC.	Tree	1	Planted by students and staff
58	<i>Ficus religiosa</i>	Tree	1	Planted by students and staff
59	<i>Melia azedarach</i>	Tree	1	Planted by students and staff
60	<i>Aglaonema commutatum</i> var. Silver king	Herb	1	Planted by students and staff
61	<i>Aglaonema modestum</i>	Herb	1	Planted by students and staff
62	<i>Bougainvillea glabra</i>	Shrub	1	Planted by students and staff
63	<i>Codiaeum variegatum</i> var. Blume	Herb	1	Planted by students and staff
64	<i>Codiaeum variegatum</i> var. Petra	Herb	1	Planted by students and staff
65	<i>Dieffenbachia amoena</i>	Herb	2	Planted by students and staff
66	<i>Dracaena sanderiana</i>	Herb	2	Planted by students and staff
67	<i>Dracaena species</i>	Herb	2	Planted by students and staff
68	<i>Ficus elastica</i>	Tree	1	Planted by students and staff
69	<i>Haworthiopsis limifolia</i>	Herb	1	Planted by students and staff
70	<i>Philodendron ceylon</i> cv. Green	Herb	2	Planted by students and staff
71	<i>Philodendron erobescens</i>	Herb	2	Planted by students and staff
72	<i>Platyclusus orientalis</i>	Herb	1	Planted by students and staff
73	<i>Spathiphyllum species</i>	Herb	2	Planted by students and staff
74	<i>Leucaena leucocephala</i>	Tree	1	Planted by staff
75	<i>Acacia spesies</i>	Shrub	1	Planted by staff
76	<i>Achorus calamus</i>	Herb	1	Planted by staff
77	<i>Adenocalymma alliaceum</i>	Herb	1	Planted by staff
78	<i>Agathis robusta</i>	Shrub	1	Planted by staff
79	<i>Agave americana</i>	Shrub	1	Planted by staff

<b>80</b>	<i>Ageratum conyzoides</i>	Herb	1	Planted by staff
<b>81</b>	<i>Alpina galanga</i>	Shrub	1	Planted by staff
<b>82</b>	<i>Anthurium philodendron</i>	Herb	1	Planted by staff
<b>83</b>	<i>Araucaria columnaris</i>	Tree	1	Planted by staff
<b>84</b>	<i>Asparagus racemosus</i>	Shrub	1	Planted by staff
<b>85</b>	<i>Asparagus racemosus</i>	Shrub	1	Planted by staff
<b>86</b>	<i>Bighonia capensis</i>	Shrub	1	Planted by staff
<b>87</b>	<i>Bindens pilosa</i>	Tree	1	Planted by staff
<b>88</b>	<i>Bombox ceiba</i>	Tree	1	Planted by staff
<b>89</b>	<i>Bombusa striata</i>	Shrub	1	Planted by staff
<b>90</b>	<i>Bombusa vetricosa</i>	Shrub	1	Planted by staff
<b>91</b>	<i>Bougainvillea spectabilis</i>	Shrub	10	Planted by staff
<b>92</b>	<i>Bougainvillea globra</i>	Shrub	5	Planted by staff
<b>93</b>	<i>Broussonetia papyrifera</i>	Tree	1	Planted by staff
<b>94</b>	<i>Brunfelsia americana</i>	Shrub	1	Planted by staff
<b>95</b>	<i>Bryophyllum pinnata</i>	Herb	1	Planted by staff
<b>96</b>	<i>Calliandra haematocephala</i>	Herb	1	Planted by staff
<b>97</b>	<i>Cantharanthus roseous</i>	Herb	1	Planted by staff
<b>98</b>	<i>Carissa carandas</i>	Shrub	1	Planted by staff
<b>99</b>	<i>Cassia fistula</i>	Tree	2	Planted by staff
<b>100</b>	<i>Catharanthus spp.</i>	Herb	1	Planted by staff
<b>101</b>	<i>Centella sp.</i>	Herb	1	Planted by staff
<b>102</b>	<i>Cestrum nocturnum</i>	Herb	1	Planted by staff
<b>103</b>	<i>Chlorophytum tuberosum</i>	Herb	1	Planted by staff
<b>104</b>	<i>Chrysalidocarpus lutescens</i>	Tree	2	Planted by staff
<b>105</b>	<i>Coccothrinax crinita</i>	Tree	2	Planted by staff
<b>106</b>	<i>Cordyline australis</i>	Shrub	1	Planted by staff
<b>107</b>	<i>Cynodon dactylon</i>	Herb	1	Planted by staff
<b>108</b>	<i>Dracaena fragrans</i>	Shrub	2	Planted by staff
<b>109</b>	<i>Dracaena reflexa</i>	Herb	2	Planted by staff
<b>110</b>	<i>Duranta repens variegated</i>	Shrub	2	Planted by staff

<b>111</b>	<i>Eucalyptus tereticornis_</i>	Tree	1	Planted by staff
<b>112</b>	<i>Euphorbia continifolia</i>	Herb	1	Planted by staff
<b>113</b>	<i>Euphorbia milii hybrid</i>	Herb	1	Planted by staff
<b>114</b>	<i>Excoecaria bicolor</i>	Herb	1	Planted by staff
<b>115</b>	<i>Ficus elastica</i>	Tree	1	Planted by staff
<b>116</b>	<i>Ficus glomerata</i>	Tree	1	Planted by staff
<b>117</b>	<i>Ficus lyrate</i>	Tree	2	Planted by staff
<b>118</b>	<i>Ficus retusa</i>	Tree	1	Planted by staff
<b>119</b>	<i>Furerea foetiala</i>	Shrub	1	Planted by staff
<b>120</b>	<i>Gmelina arborea</i>	Tree	1	Planted by staff
<b>121</b>	<i>Grewia elastica</i>	Tree	1	Planted by staff
<b>122</b>	Hibiscus mutabilis	Shrub	2	Planted by staff
<b>123</b>	<i>Hibiscus rosa sinensis</i>	Shrub	2	Planted by staff
<b>124</b>	<i>Holoptelea integrifolia</i>	Tree	2	Planted by staff
<b>125</b>	<i>Jatropha curcas</i>	Shrub	2	Planted by staff
<b>126</b>	<i>Juniperus communis</i>	Tree	1	Planted by staff
<b>127</b>	<i>Lagestromia indica</i>	Shrub	1	Planted by staff
<b>128</b>	<i>Livistona chinensis</i>	Tree	1	Planted by staff
<b>129</b>	<i>Mangifera indica</i>	Tree	2	Planted by staff
<b>130</b>	<i>Mallotus philippensis</i>	Tree	1	Planted by staff
<b>131</b>	<i>Melia azadirach</i>	Tree	1	Planted by staff
<b>132</b>	<i>Michelia champaka</i>	Shrub	1	Planted by staff
<b>133</b>	<i>Mimusops elengi</i>	Tree	1	Planted by staff
<b>134</b>	<i>Mongolia grand flora</i>	Shrub	1	Planted by staff
<b>135</b>	<i>Monstera deliicosa</i>	Shrub	1	Planted by staff
<b>136</b>	<i>Murraya coenigii</i>	Shrub	1	Planted by staff
<b>137</b>	<i>Murraya paniculata</i>	Shrub	1	Planted by staff
<b>138</b>	<i>Parkia roxburghii</i>	Tree	1	Planted by staff
<b>139</b>	<i>Parthenium hysterophorous</i>	Herb	1	Planted by staff
<b>140</b>	<i>Philodendran</i>	Shrub	1	Planted by staff
<b>141</b>	<i>Phoenix spesies</i>	Tree	5	Planted by staff

142	<i>Phoenix sylvestis</i>	Tree	15	Planted by staff
143	<i>Pinus roxbughii</i>	Tree	1	Planted by staff
144	<i>Piper longum</i>	Shrub	1	Planted by staff
145	<i>Plantago ovata</i>	Shrub	1	Planted by staff
146	<i>Polyalthia longifolia_</i>	Tree	5	Planted by staff
147	<i>Popules deltoides</i>	Tree	1	Planted by staff
148	<i>Punica granatum</i>	Shrub	1	Planted by staff
149	<i>Quisqualis indica</i>	Herb	1	Planted by staff
150	<i>Raphis subtilis</i>	Shrub	1	Planted by staff
151	<i>Roystona regia</i>	Tree	1	Planted by staff
152	<i>Saraca asoka</i>	Tree	1	Planted by staff
153	<i>Shorea robusta</i>	Tree	2	Planted by staff
154	<i>Solanum nigrum</i>	Herb	1	Planted by staff
155	<i>Spilanthes acmella</i>	Herb	1	Planted by staff
156	<i>Stvia reboundiana</i>	Herb	1	Planted by staff
157	<i>Syngonium elegans</i>	Herb	1	Planted by staff
158	<i>Syzygium cumini</i>	Tree	1	Planted by staff
159	<i>Tabernaemontana coronaria</i>	Shrub	1	Planted by staff
160	<i>Tecoma stans</i>	Tree	1	Planted by staff
161	<i>Terminalia myriocarpa</i>	Tree	1	Planted by staff
162	<i>Terminalia myriocarpa</i>	Tree	1	Planted by staff
163	<i>Thuja compacta</i>	Shrub	1	Planted by staff
164	<i>Trewia nudiflora</i>	Tree	1	Planted by staff
165	<i>Tylophora ashamtica</i>	Shrub	1	Planted by staff
166	<i>Zizyphus nummularia</i>	Shrub	1	Planted by staff
167	<i>Tinospora cordifolia</i>	Herb	1	Planted by staff

**Table 3: Details of the Flora in the premises**

At present there are **more than 11,000 plantations of various typologies** in entire site.

**The study suggests that there is scope to document the plantations further through coding, numbering and book.**

**Additionally, a display board about 'Green zone' could be undertaken.**

### 5.3 Fauna audit

The campus is located in a rural area, thanks to the lush green and well-maintained campus it is homes to varieties of fauna species. The following information has been documented by the Internal team.

Names	Typology
Birds	
<i>Passer domesticus,</i>	House Sparrow
<i>Psittaciformes,</i>	Parrot
Flamingo	Bagula
Insects	
<i>Coccinella hieroglyphica</i> L.(Hieroglyphic Ladybird)	Beetle
<i>Coccinella leonina_</i> F(Orange-spotted ladybird)	Beetle
<i>Coccinella quinquepunctata_</i> L. (Five-spot Ladybird)	Beetle
<i>Coccinella septempunctata</i> (L.), (Seven-spot ladybug)	Beetle
<i>Coccinella transversalis</i> F. (transverse ladybird)	Beetle
<i>Euethola humilis</i> (B.)(Coleoptera _ Scarabaeidae)	Beetle
<i>Halmus chalybeus</i> (Boisduval (steelblue ladybird)	Beetle
<i>Harmonia Conformis</i> (Boisduval) (large spotted ladybird)	Beetle
<i>Harmonia dimidiata</i> (F)	Beetle
<i>Hippodamia veriegata</i> Goeze	Beetle
<i>Onthophagus gazella</i> (F) (Gazella Scarab)	Beetle
<i>Arhopala amantas</i> (Hewitson Large Oak Blue )	Butterfly
<i>Colias fieldii</i> Memetries(Dark Clouded Yellow butterfly)	Butterfly
<i>Cyrestis thyodamas</i> Boisduval,(Painted lady)	Butterfly
<i>Danaus chrysippus</i> (L.) Plain Tiger	Butterfly
<i>Danaus genuita genuita</i> (Cramer,) The CommonTiger	Butterfly
<i>Delias eucharis</i> (Drury) Common Jezebel	Butterfly
<i>Euplea Core core</i> (Cramer) Common Indian Crow	Butterfly
<i>Euplea mulciber</i> (Cramer) The Striped Blue Crow	Butterfly
<i>Junonia almana almana</i> (Linnaeus) Peacock Pansy	Butterfly
<i>Junonia lemonias</i> Linnaeus (L.) Lemon Pancy	Butterfly
<i>Papilio pylotes</i> . L. (Common mormon)	Butterfly

<i>Parantica aplea melanoides</i> (Stoll ) The Glass Tiger	Butterfly
<i>Phalanta phalantha</i> (Drury) The Common Leopard	Butterfly
<i>Pieris brassicae</i> (L.) Cabbage Butterfly	Butterfly
<i>Tirumala hamata septentrionis</i> (Butler) Dark Blue Tiger	Butterfly
<i>Agrius convolvuli</i> (L.) Large hawk moth	Moth
<i>Ambulyx liurata</i> Butler, (Violet Gliding moth)	Moth
<i>Anthereae pernyi</i> (Guerin-Meneville) Oak silkmoth	Moth
<i>Asota caricae</i> , (F) Tropical Tiger Moth	Moth
<i>Boarmia species</i> Schiffermüller	Moth
<i>Cephonodes hylas</i> (L.) Coffee bee hawkmoth	Moth
<i>Comibaena cassidara</i> (Guenee, 1857	Moth
<i>Eupterotidae undata</i> , Blanchard	Moth
<i>Ganisa plana</i> Walker	Moth
<i>Junonia iphita</i> Cramer, (Chocklate pansy)	Moth
<i>Musca domestica</i>	House fly
<i>Anopheles sp</i>	Mosquitoes
<i>Poecilocercus pictus</i>	Grasshopper
<i>Formica rufa</i> L.	Ant
Aedes sp	Dengue Mosquitoes
Invertebrates	
<i>Scorpio maurus</i> ,	Scorpione
<i>Argiope catenulata</i>	Spider
Reptilian	
<i>Lacertilia</i>	Lizard
<i>Viper</i>	Snake
<i>Chameleon</i>	Girgit
Ambhibian	
<i>Bombina bombina</i>	Toad
<i>Rana tigrina</i>	Frog
Mammals	
<i>Callosciurus prevostii</i> )	Squirrel
<i>Trachypithecus phayrei</i>	Monkey

**Table 4: Fauna information in the premises**



**The study suggests that there is scope to document the fauna in a publication format for stakeholder sensitization and awareness.**

## 5.4 Noise Audit

The noise study is determined based on noise levels observed in and around the campus. the campus is located in a rural area with forest covers all over there are extremely low noise levels in and around te site.

***The study suggests that outside the campus a signboard could be displayed that highlights 'Silent zone' and 'No honking zone' being an Educational Institute.***

## 5.5 Carbon Footprint Audit

### 5.5.1 Eco-friendly Commuting Practices

- The stakeholders of the premises include hostilities, staff members and day scholars who commute using local modes. Buses are provided to the hostel students to commute back and forth to the premises.
- In addition, the staff members who stay far off from the premises too commute using public and private mode.

***The study suggests the current practices are fine and should be continued.***



***Plate 7: Buses and road safety manual provided to the stakeholders***

## 5.5.2 Heat Island Reduction

Huge green cover in the form of recreational ground keeps the outdoor climate under control by absorbing the harsh sun rays. Moreover the climatic zone of the campus faces colder temperatures throughout the year.

## 5.5.3 Outdoor Light Pollution Study

The Institute compound lights are not upward looking thus, these do not cause light pollution.

## 5.6 Life Safety

Fire and life safety are an important consideration of the National Building Code 2016.

This aspect is touched upon as part of this study in the capacity of an Architect registered with the Council of Architecture. As part of the research, fire safety audit was considered from the 'Building systems' perspective. All provisions documented below:

- **Fire extinguisher**
- **Sand buckets**
- **Lab safety measures**
- **Emergency contact nos. display**



*Plate 8: Fire and life safety measures*



Laboratory Safety

# LABORATORY SAFETY

### LABORATORY DRESS

**Splash Goggles**

**Gloves**

**Face Shield**

**Laboratory coat**  
Also wear shoes that are closed from all sides

### HOUSEKEEPING

Keep the laboratory clean and organized.

A place for everything and everything in its place.

### CHEMICAL SPILLS

- Wear shoes covered from all sides while cleaning chemical spills.
- Do not just sweep spilled chemicals with a broom.
- Spray agents that solidify chemical spills or neutralize them.
- Do not dump the cloth soaked in spilled chemical in a waste bin. That cloth then becomes hazardous.
- Ventilate the room.

### TRANSFERRING LIQUIDS

Pour the liquid down a stirring rod to avoid splattering

Never pipette by mouth

Always add acid to water

Use funnel while pouring from a wide mouth container to a small mouth container

### LABELING CHEMICALS

**CAUTION**  
CHEMICAL STORAGE ONLY  
NO FOOD OR DRINK IN THIS UNIT

Always store chemicals in a rack and place a caution sign.

Do not use chemicals from unlabeled containers

### HEATING CHEMICALS

Keep the direction of the mouth of the test tube away from yourself and others.

Wear safety glasses while heating in a laboratory

Heat gently to avoid splattering

While boiling, leave the stirring rod in the beaker

### EYE WASH

Let water go directly into the eyes. Keep your hands free to hold your eyes open. Rinse eyeballs and interior of the eye gently for about 15 minutes.

### WATER REACTIVE METALS

- Water reactive metals react violently with water.
- Handle them with extreme caution. Direct contact with them causes burns.
- Store Sodium, Lithium and Potassium under dry mineral oil or dry kerosene.
- Store metals in tight containers.
- Do not store Potassium for very long periods.

Metal cans provide durable storage, are fire resistant and break resistant for several hazardous chemical.

Potassium and dry mineral oil

Absorbent material

### FIRE EXTINGUISHERS

CAUSE OF FIRE	TYPE OF FIRE EXTINGUISHER				
	HALON	DRY CHEMICAL	CARBON DIOXIDE	POWDER CLASS	SAND BUCKET
A. easily combustibles like paper, wood and trash	YES	YES	NO offers very little protection	NO	NO
B. flammable liquids like alcohol	YES	YES	YES	NO	NO
C. electrical equipments	YES	YES	YES	NO	NO
D. water reactive chemicals	NO	NO	NO	YES	YES

### HARMFUL VAPOURS

Ventilate the room. Open all doors and windows.

Use respirator

Use fume hood

Switch on the exhaust fan and open all windows to let the vapours out.

### WASTE CONTAINERS

- Sort your laboratory waste.
- Dispose hazardous and non-hazardous waste in separate bins and bags.
- Maintain separate bins for chemicals, broken glasses, and general waste.
- Identify all bins by marking them or by different colours.

### SAFETY RULES

- Do not perform unauthorized experiments.
- Never work alone in the laboratory.
- Report all accidents immediately to the teacher or the laboratory in-charge.
- If toxic vapours are generated, use fume hood.
- Wear a chemical splash goggles and resistant gloves.
- Wear a chemical resistant apron or coat.
- Tie back long hair.
- Do not wear loose sleeves.
- Do not wear shorts.
- Do not wear sandals.
- No food or beverage inside the laboratory.
- Do not leave experiments unattended.
- Keep knowledge of the exits, safety showers, eye wash, fire blankets and extinguishers.
- Do not run around in the laboratory.
- Keep the working shelf and the laboratory clean.
- Extinguish burners when away from desk.

© Copyright Reserved

Plate 9: Lab safety manual in the premises





*Plate 10: Fire zone with all measures in backyard area of premises*

***The study suggests that:***

- ***The wiring should be concealed***
- ***There should be documentations of the switchboards and main boards such as SB1, MB1 further the switches should be documented appropriately***

***Overall, the study suggests the current practices are fine, however few up gradations are suggested as follows:***

- ***Fireballs/ sand buckets can be introduced these spaces would be the ones that have an air conditioner or any combustible equipment.***
- ***PASS Board near fire extinguishers and RACE Board near entrance***
- ***There should be additional provisions in the laboratories including:***
  - ***Eye washers***
  - ***Rubber flooring as an electrical safety measure***

## 6. Suggestion

### 6.1 General suggestions

The following are consolidated study related to 'entire Institute' should be considered as **second priority** once section wise recommendations are implemented.

#### 6.1.1 Site beautification

No changes proposed for this section.

#### 6.1.2 Heat island reduction

No changes proposed for this section.

#### 6.1.3 Life safety

- **Combustible equipment** - Every space which has a gas cylinder or combustible equipment should barricade around gas cylinders, appropriate safety board's mentioning 'danger sign' and 'Do not touch' with an additional small fire extinguisher close by.
- **Awareness** - Fire layouts in immediate spaces outside the lift, on the staircase landing, signages mentioning 'Do not use lift in case of fire' additionally fire exit signages, boards should be put up at all possible locations.
- *The **fire and life safety signages (Including exit signages)** should be increased and displayed.*
- *There should be a **PASS Board** alongside every fire extinguisher and a **RACE Board** at the location of extreme populace/ footfalls.*



*Reference suggestions 1: PASS Board display*

### 6.1.4 Pollution Control

- ➔ **Specific area designated for E-vehicles** – There should be designated area dedicated to E-vehicles parking and charging and this zone should be demarcated as 'Eco-Zone'
- ➔ **Promote the use of Eco-friendly vehicles** - There can be student and staff sensitization program on eco-friendly and battery-operated vehicles/ low emission vehicles for daily use.
- ➔ **Battery charging points for Eco-friendly vehicles** - There can be provision for battery charge points, this would inspire students to change their mode of transportation and adopt sustainable practices.
- ➔ **Avoid burning waste** - The waste produced on the premises should not be burned as it is dangerous to the health of students and staff
- ➔ **Bicycles as a gift** - As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.



## 7. Compilation

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

### National references

- ➔ Uniform Plumbing Code – India, 2008
- ➔ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- ➔ IGBC Green Landscape Rating system, March 2013

### International references

- ➔ BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- ➔ Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and [www.umassd.edu](http://www.umassd.edu)
- ➔ The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- ➔ Streetscape elements – Chapter 6 on San Francisco
- ➔ American lung association <https://www.lung.org/>
- ➔ Study related to air pollution <https://www.airgle.com/>
- ➔ Exploring the light pollution <https://education.nationalgeographic.org/>
- ➔ Accessibility study <https://www.washington.edu/>
- ➔ Urban heat island effect <https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands>

